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## NOTICE OF ALLOWANCE AND FEE(S) DUE

32172 7590 04/10/2009

DICKSTEIN SHAPIRO LLP  
1177 AVENUE OF THE AMERICAS (6TH AVENUE)  
NEW YORK, NY 10036-2714

EXAMINER	
NGUYEN, KHANH TUAN	
ART UNIT	PAPER NUMBER
1796	

DATE MAILED: 04/10/2009

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/576,801	04/21/2006	Masato Nomiya	M1071.1967	5833

TITLE OF INVENTION: ELECTRICALLY CONDUCTIVE PASTE AND MULTILAYER CERAMIC SUBSTRATE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	07/10/2009

**THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.**

**THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.**

**HOW TO REPLY TO THIS NOTICE:**

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

**IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.**

## PART B - FEE(S) TRANSMITTAL

**Complete and send this form, together with applicable fee(s), to:** **Mail Stop ISSUE FEE**  
**Commissioner for Patents**  
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**INSTRUCTIONS:** This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

32172      7590      04/10/2009

**DICKSTEIN SHAPIRO LLP**  
**1177 AVENUE OF THE AMERICAS (6TH AVENUE)**  
**NEW YORK, NY 10036-2714**

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

### **Certificate of Mailing or Transmission**

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)

(Signature)

(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/576,801	04/21/2006	Masato Nomiya	M1071.1967	5833

TITLE OF INVENTION: ELECTRICALLY CONDUCTIVE PASTE AND MULTILAYER CERAMIC SUBSTRATE

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	07/10/2009
EXAMINER	ART UNIT	CLASS-SUBCLASS				
NGUYEN, KHANH TUAN		1796	252-512000			

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.  
 "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively,  
(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 \_\_\_\_\_  
2 \_\_\_\_\_  
3 \_\_\_\_\_

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent):  Individual  Corporation or other private group entity  Government

4a. The following fee(s) are submitted:

- Issue Fee  
 Publication Fee (No small entity discount permitted)  
 Advance Order - # of Copies \_\_\_\_\_

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- A check is enclosed.  
 Payment by credit card. Form PTO-2038 is attached.  
 The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number \_\_\_\_\_ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.  b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature \_\_\_\_\_

Date \_\_\_\_\_

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Registration No. \_\_\_\_\_

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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10/576,801	04/21/2006	Masato Nomiya	M1071.1967	5833
32172	7590	04/10/2009	EXAMINER	
DICKSTEIN SHAPIRO LLP 1177 AVENUE OF THE AMERICAS (6TH AVENUE) NEW YORK, NY 10036-2714				NGUYEN, KHANH TUAN
ART UNIT		PAPER NUMBER		
1796				DATE MAILED: 04/10/2009

## Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)

(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 0 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 0 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

<b>Notice of Allowability</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/576,801	NOMIYA ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	

KHANH T. NGUYEN  
1796

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1.  This communication is responsive to 02/27/2009.
2.  The allowed claim(s) is/are 1,3-7,9,11,12,14-20,23 and 24.
3.  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a)  All    b)  Some\*    c)  None    of the:
    1.  Certified copies of the priority documents have been received.
    2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3.  Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4.  A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5.  CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a)  including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1)  hereto or 2)  to Paper No./Mail Date \_\_\_\_\_.
  - (b)  including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6.  DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1.  Notice of References Cited (PTO-892)
2.  Notice of Draftsperson's Patent Drawing Review (PTO-948)
3.  Information Disclosure Statements (PTO/SB/08),  
Paper No./Mail Date 05/09/2008 and 09/12/2008
4.  Examiner's Comment Regarding Requirement for Deposit of Biological Material
5.  Notice of Informal Patent Application
6.  Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_.
7.  Examiner's Amendment/Comment
8.  Examiner's Statement of Reasons for Allowance
9.  Other \_\_\_\_\_.



## **DETAILED ACTION**

### **EXAMINER'S AMENDMENT**

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Mr. Edward A. Meilman (Reg. No. 24,735) on April 02, 2009.

2. The application has been amended as follows:

2.1 Please amend claim 1 to read:

-- 1 (Currently amended). An electrically conductive paste which can be used for forming wiring conductors and which can be co-fired when firing for sintering ceramic layers in a multilayer ceramic substrate provided with the plurality of laminated ceramic layers with the wiring conductors disposed in

association with the ceramic layers, the electrically conductive paste comprising

60 to 85 percent by weight of a metal powder having an inorganic component which is not sintered at a sintering temperature capable of sintering the ceramic layer in the firing and which is an oxide of at least one of Al, Si, Zr, Ni, Ti, Nb, Mn and Mg disposed on particle surfaces of the metal powder, and

1 to 10 percent by weight of a glass frit having a softening point 150°C to 300°C lower than the sintering temperature, and an organic vehicle,

wherein the softening point of the glass frit is 650°C to 850°C and the glass frit contains 40 to 55 percent by weight of SiO<sub>2</sub>, 10 to 20 percent by weight of B<sub>2</sub>O<sub>3</sub> and 20 to 30 percent by weight of one or both of BaO and SrO.--

***Information Disclosure Statement***

3. The information disclosure statement (IDS) filed on 09/12/2008 has been considered. An initialed copy accompanies this Office Action.
  
4. The information disclosure statement filed 05/09/2008 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because no legible copy of non patent literature documents were submitted. It has been placed in the application file,

but the information referred to therein has not been considered as to the merits. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609.05(a).

***Examiner's Statement of Reason for Allowance***

5. The amendment filed on 02/27/2009 has overcome all claim objections and prior art rejections.
6. Claims 1, 3-7, 9, 11, 12, 14-20, and 23-24 are allowed over the prior art of record.
7. The following is an examiner's statement of reasons for allowance: The claims, filed on 02/27/2009 have been carefully reviewed and searched. The best prior art to U.S. Pat. 4,894,184 (Fukuoka), U.S. Pat. 4,594,181 (Siuta), U.S. Pub. 2004/0144962 A1 (Hayakawa), U.S. Pat. 5,298,330 (Stadnicar), and U.S. Pub. 2006/0083906 A1 (Cho) alone or in combination failed to teach or suggest the instant claimed invention.

Specifically, **U.S. Pat. 4,894,184 (Fukuoka)** teaches a low-temperature conductive paste comprises of 50 to 95 wt. % of a conductive powder selected from a copper powder, copper alloy powder or copper oxide powder and 5 to 50 wt. % of a

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glass powder (i.e. glass frit) having a softening point of 300°C to 600°C dispersed in an organic vehicle (Col. 2, lines 23-33). Fukuoka discloses the said copper oxide powder contains an oxide film on the surface of the metal powder (Col. 2, lines 48-49). The said conductive paste is used for connecting circuits on insulating boards such as ceramic boards (Col. 1, lines 12-25 and Col. 2, lines 15-23). However, Fukuoka failed to suggest a metal powder (e.g. copper) having an oxide of at least one of Al, Si, Zr, Ni, Ti, Nb, Mn, and Mg disposed on the surface of said metal powder. Fukuoka also failed to suggest a glass frit having a softening point of 650°C to 850°C wherein said glass frit has a composition as recited in amended claim 1.

**U.S. Pat. 4,594,181 (Siuta)** teaches a metal oxide-coated copper powder that is useful in conductor paste in laminated multilayer structures. The said metal oxide may be selected from the oxides of Si, Ti, Ce, Zr, Al, Ba, Li, Sr, La, Mg, Ca, V, Ta and the mixtures thereof (Col. 4, lines 11-13). The disclosure of Al oxide and Zr oxide are readable on the claimed alumina and zirconia inorganic components. In one embodiment, Siuta discloses copper alloy particle such as Cu/Cd, Cu/Cr, Cu/Ti and Cu/Cr is also useful as conductor (Col. 6, lines 14, 20). Siuta teaches said powder having an average particle size of 1-5 microns (Col. 5, lines 24). Siuta also teaches the metal oxide-coated provide the copper powder with improve shrinkage characteristics and increase sintering temperature (Col. 2, lines 42-54). However, Siuta failed to disclose a glass frit having a softening point of 650°C to 850°C wherein said glass frit has a composition as recited in amended claim 1.

**U.S. Pub. 2004/0144962 A1 (Hayakawa)** teaches electrically conductive paste comprising of 5 to 20 wt. % of glass frit [0015] having a softening point of 530°C to 650°C [0010] and metal particles selected from copper, nickel, copper-nickel alloy having an average particle size of 0.5 to 30 microns [0019]. Hayakawa teaches said paste also contains 10 to 35 wt. % of an organic medium (i.e. organic vehicle) [0020]. Hayakawa further teaches the content of metal particles and glass frit ranges from 55 to 85 wt. % [0015]. In one embodiment, Hayakawa teaches the glass frit containing 22 wt. % SiO<sub>2</sub>, 20 wt. % of B<sub>2</sub>O<sub>3</sub>, 22 wt. % of BaO, 27 wt. % of ZnO, 5 wt. % of SrO, and 3 wt. % of Al<sub>2</sub>O<sub>3</sub> (Table 1, Example CE 4). However, Hayakawa failed to disclose a glass frit composition containing of 40-55 wt. % of SiO<sub>2</sub> as recited in amended claim 1. Hayakawa also failed to suggest a metal particle having an oxide of at least one of Al, Si, Zr, Ni, Ti, Nb, Mn, and Mg disposed on the surface of said metal powder.

**U.S. Pat. 5,298,330 (Stadnicar)** teaches a thick film paste composition for forming resistors, dielectrics and conductors in hybrid microelectronic components that includes a conductive, resistive or dielectric component; a bonding material, such as a glass or inorganic oxide; and a vehicle, usually an organic compound or polymer, that serves as a dispersing medium or vehicle for the inorganic components of the paste (Col. 1, lines 14-25). Stadnicar teaches using a conductive metal, such as noble metals, to provide conductive to the paste (Col. 3, lines 14-17; Example III at Col. 6, line 48). Stadnicar also teaches the glass may comprise of 27-56.5 wt. % SiO<sub>2</sub>, 4.5-25 wt. % of B<sub>2</sub>O<sub>3</sub>, 0-47 wt. % of BaO, and 3-14 wt. % of Al<sub>2</sub>O<sub>3</sub> (Col. 3, Table 1). In one embodiment, Stadnicar teaches the glass composition containing 28-45 wt. % SiO<sub>2</sub>, 7-

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20 wt. % of  $B_2O_3$ , 20-30 wt. % of  $BaO$ , and 2-14 wt. % of  $Al_2O_3$  (Col. 4, Table 2, Glass C). Stadnicar teaches a glass composition containing all the ingredients within the proportion recited in claimed 1. However, Stadnicar failed to suggest a noble metal powder having an oxide of at least one of Al, Si, Zr, Ni, Ti, Nb, Mn, and Mg disposed on the surface of the metal powder.

**U.S. Pub. 2006/0083906 A1 (Cho)** teaches a glass composition comprising of, in mol %, 1-10% MO where M is selected from Ba, Sr, Ca and mixtures thereof, 5-30%  $MgO$ , 0.3-5%  $CuO$ , 24-45%  $ZnO$ , 0-2.5%  $P_2O_5$ , 0-2.5%  $ZrO$ , 2, 2-10%  $Al_2O_3$ , 35-50%  $SiO_2$  and 0.1-3%  $A_2O$  where A is selected from the group of alkali elements, for example, Li, Na and K, and mixtures thereof [0035]. Cho teaches the large contents of zinc and silicon in glass are believed to provide a low TCE value. However, Cho failed to suggest a noble metal powder having an oxide of at least one of Al, Si, Zr, Ni, Ti, Nb, Mn, and Mg disposed on the surface of the metal powder.

The above references alone or in combination failed to teach or suggest an electrically conductive paste comprising of a metal oxide coated metal powder, a glass frit, and organic vehicle as recited in amended claimed 1. Furthermore, there is no motivation to modify the cited arts to include the combination of ingredients as recited in amended claimed 1. Therefore, claims 1, 3-7, 9, 11, 12, 14-20, and 23-24 are allowed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

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8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KHANH T. NGUYEN whose telephone number is (571) 272-8082. The examiner can normally be reached on Monday-Friday 7:00-4:00 EST PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on (571) 272-1302. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark Kopec/  
Primary Examiner, Art Unit 1796

/Khanh Tuan Nguyen/  
Examiner  
04/02/2009